

IN THE CLAIMS:

- 1 1. (Canceled)
- 1 2. (Previously Presented): The method of claim 63, wherein the storage time is based on
2 one or more of: an actual time, a time interval, and an event.
- 1 3. (Previously Presented): The method of claim 61, further comprising:
2 prior to detecting changed locations, generating a baseline image, where the baseline
3 image includes at least the one or more data files.
- 1 4. (Original): The method of claim 3, wherein generating a baseline image includes:
2 generating one or more of: a volume image, a file image, and a snapshot image.
- 1 5. (Previously Presented): The method of claim 61, wherein detecting changed locations
2 includes:
3 at a time prior to the storage time,
4 generating a baseline image of at least the one or more data files, and,
5 using one or more data integrity procedures to generate a summary of the
6 baseline image;
7 thereafter,
8 generating a second image of at least the one or more data files, and,
9 using the one or more data integrity procedures to generate a summary of the
10 second image; and,
11 based on the baseline summary and the second summary, determining whether the
12 one or more data files includes changed locations.
- 1 6. (Original): The method of claim 5, wherein the one or more data integrity procedures
2 include one or more of: a cyclic redundancy check procedure and an MD5 procedure.

1 7. (Canceled):

1 8. (Canceled)

1 9. (Canceled)

1 10. (Previously Presented): The method of claim 61, wherein storing the contents includes:
2 selecting at least one memory to store the contents.

1 11. (Original): The method of claim 10, wherein selecting at least one memory includes:
2 selecting the at least one memory to be distinct from a previously selected memory
3 associated with a prior storage time.

1 12. (Canceled)

1 13. (Previously Presented): The method of claim 63, wherein providing the associations
2 includes:
3 generating one or more indexes to associate: the stored contents, the respective
4 storage times, the respective changed locations, and one or more respective file identifiers.

1 14. (Original): The method of claim 13, wherein the one or more indexes include:
2 a first index to the changed locations based on the one or more file identifiers, and
3 a second index to the stored contents based on the changed locations.

1 15. (Previously Presented): The method of claim 61, further comprising:
2 using the stored contents to create a version of a selected one of the one or more data
3 files.

1 16. (Previously Presented): The method of claim 15, wherein using the stored contents to
2 create a version includes:

3 for each of one or more storage times associated with the version: querying one or
4 more indexes that associate the stored contents, the respective storage times, the respective
5 changed locations, and one or more respective file identifiers, to identify stored contents and
6 respective changed locations associated with the selected data file, and

7 combining the identified stored contents with data from a baseline image associated
8 with the selected data file.

1 17. (Previously Presented): : The method of claim 16, wherein querying includes:

2 determining that the changed locations are the same for two or more different storage
3 times, and,

4 identifying the stored contents of the changed locations associated with the latest of
5 the two or more different storage times.

1 18. (Currently amended) The method of claim 63, further comprising:

2 receiving from a first server a request to create a version of a selected one of the one
3 or more data files, and

4 based on the request:

5 for each of one or more storage times associated with the version: querying
6 one or more indexes that associate the stored contents, the respective storage times, the
7 respective changed locations, and one or more respective file identifiers, to identify stored
8 contents and respective changed locations associated with the selected data file, and

9 providing the identified stored contents and respective changed locations to
10 the first server.

1 19. (Original): The method of claim 18, further comprising:

2 at the first server, combining the identified stored contents with data from a baseline
3 image associated with the selected data file.

1 20. (Previously Presented): The method of claim 63, further comprising:
2 at a coalescence time, coalescing:
3 two or more stored contents associated with the same file and two or more
4 different storage times,
5 the respective changed locations associated with the two or more coalesced
6 contents, and
7 one or more indexes to associate the coalesced contents, the respective
8 coalesced changed locations, an identifier of the file with which those contents are
9 associated, and the latest of the two or more different storage times.

1 21. (Previously Presented): The method of claim 63, further comprising:
2 at a coalescence time, coalescing:
3 two or more stored contents associated with the same file and the same
4 storage time,
5 the respective changed locations associated with the two or more coalesced
6 contents, and
7 one or more indexes to associate the coalesced contents, the respective
8 coalesced changed locations, an identifier of the file with which those contents are
9 associated, and the same storage time.

1 22. (Original): The method of claim 21, wherein the coalescence time is based on one or
2 more of: an actual time, a time interval, and an event.

1 23. (Original): The method of claim 22, wherein the event includes an event based on an
2 available storage capacity of a storage medium.

1 24. (Canceled)

1 25. (Canceled)

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1 34. (Canceled)

1 35. (Canceled)

1 36. (Canceled)

1 37. (Canceled)

1 38. (Previously Presented): The storage medium of claim 66, wherein the storage time is
2 based on one or more of: an actual time, a time interval, and an event.

1 39. (Canceled) The processor program of claim 37, wherein the instructions to detect
2 changed locations include instructions to dynamically detect the changed locations in the
3 one or more data files.

1 40. (Previously Presented): The storage medium of claim 64, wherein the instructions to
2 store the contents include instructions to select at least one memory to store the contents.

1 41. (Previously Presented): The storage medium of claim 40, wherein the instructions to
2 select at least one memory include instructions to select the at least one memory to be
3 distinct from a previously selected memory associated with a prior storage time.

1 42. (Canceled)

1 43. (Previously Presented): The storage medium of claim 66, wherein the instructions to
2 provide the associations include instructions to generate one or more indexes to associate:
3 the stored contents, the respective storage times, the respective changed locations, and one
4 or more respective file identifiers.

1 44. (Previously Presented): The storage medium of claim 43, wherein the one or more
2 indexes include:
3 a first index to the changed locations based on the one or more file identifiers, and
4 a second index to the stored contents based on the changed locations.

1 45. (Previously Presented): The storage medium of claim 64, further comprising
2 instructions to use the stored contents to create a version of a selected one of the one or more
3 data files.

1 46. (Previously Presented): The storage medium of claim 45, wherein the instructions to
2 use the stored contents to create a version include instructions to:
3 for each of one or more storage times associated with the version: query one or more
4 indexes that associate the stored contents, the respective storage times, the respective
5 changed locations, and one or more respective file identifiers, to identify stored contents and
6 respective changed locations associated with the selected data file, and

7 combine the identified stored contents with data from a baseline image associated
8 with the selected data file.

1 47. (Previously Presented): The storage medium of claim 64, further comprising
2 instructions to receive from a first server a request to create a version of a selected one of the
3 one or more data files, and

4 based on the request:

5 for each of one or more storage times associated with the version: query one
6 or more indexes that associate the stored contents, the respective storage times, the
7 respective changed locations, and one or more respective file identifiers, to identify stored
8 contents and respective changed locations associated the selected data file, and

9 provide the identified stored contents and respective changed locations to the
10 first server.

1 48. (Previously Presented): The storage medium of claim 47, further comprising
2 instructions to, at the first server, combine the identified stored contents with data from a
3 baseline image associated with the selected data file.

1 49. (Canceled)

1 50. (Previously Presented): The system of claim 69, wherein the storage time is based on
2 one or more of: an actual time, a time interval, and an event.

1 51. (Canceled)

1 52. (Previously Presented): The system of claim 67, wherein at least one said agent selects
2 at least one memory to store the contents.

1 53. (Previously Presented): The system of claim 52, wherein at least one said memory
2 selected by at least one said agent is distinct from a previously selected memory associated
3 with a prior storage time.

1 54. (Canceled)

1 55. (Previously Presented): The system of claim 69, wherein at least one said agent
2 provides the associations by generating one or more indexes to associate: the stored
3 contents, the respective storage times, the respective changed locations, and one or more
4 respective file identifiers.

1 56. (Original): The system of claim 55, wherein the one or more indexes include:
2 a first index to the changed locations based on the one or more file identifiers, and
3 a second index to the stored contents based on the changed locations.

1 57. (Previously Presented): The system of claim 69, further configured to use the stored
2 contents to create a version of a selected one of the one or more data files.

1 58. (Previously Presented): The system of claim 57, wherein the system is configured to
2 use the stored contents to create a version include processor instructions by:
3 for each of one or more storage times associated with the version: querying one or
4 more indexes that associate the stored contents, the respective storage times, the respective
5 changed locations, and one or more file respective identifiers, to identify stored contents and
6 respective changed locations associated with the selected data file, and
7 combine the identified stored contents with data from a baseline image associated
8 with the selected data file.

1 59. (Previously Presented): The system of claim 69, further further configured to receive
2 from a first server a request to create a version of a selected one of the one or more data
3 files, and
4 based on the request:
5 for each of one or more storage times associated with the version: query one
6 or more indexes that associate the stored contents, the respective storage times, the
7 respective changed locations, and one or more respective file identifiers, to identify stored
8 contents and respective changed locations associated the selected data file, and
9 provide the identified stored contents and respective changed locations to the
10 first server.

1 60. (Previously Presented): The system of claim 59, further configured to, at the first
2 server, combine the identified stored contents with data from a baseline image associated
3 with the selected data file.

1 61. (Previously Presented): For maintaining in a backup storage system information from
2 which a set of source files stored on a source storage system can be restored, a method that
3 includes, for each of a sequence of storage times:

- 4 A) by monitoring writes to files in the source storage system since the previous
5 storage time, identifying locations in the source storage system where
6 changes have been made since that previous storage time; and
7 B) in response to thus identifying locations, storing in the backup storage
8 system:
9 i) contents that at that storage time occupy locations thus identified; and
10 ii) associations of those contents with those locations.

1 62. (Previously Presented): A method as defined in claim 61 wherein the associations of
2 the contents with the locations associate the contents with the files in the source storage
3 system to which those contents were written.

1 63. (Previously Presented): A method as defined in claim 62 further including providing in
2 the backup storage system associations between the contents there stored and the storage
3 times for which those contents were stored.

1 64. (Previously Presented): For configuring a computer system that includes a source
2 storage system and a backup storage system to maintain in the backup storage system
3 information from which a set of source files stored on the source storage system can be
4 restored, a storage medium containing instructions readable by the computer system to
5 configure the computer system to, for each of a sequence of storage times:

6 A) by monitoring writes to files in the source storage system since the previous
7 storage time, identify locations in the source storage system where changes
8 have been made since that previous storage time; and

9 B) in response to thus identifying locations, store in the backup storage system:

- 10 i) contents that at that storage time occupy locations thus identified; and
11 ii) associations of those contents with those locations.

1 65. (Previously Presented): A storage medium as defined in claim 64 wherein the
2 associations of the contents with the locations associate the contents with the files in the
3 source storage system to which those contents were written.

1 66. (Previously Presented): A storage medium as defined in claim 65 wherein the
2 instructions further configure the computer system to provide in the backup storage system
3 associations between the contents there stored and the storage times for which those contents
4 were stored.

1 67. (Previously Presented): A computer system that includes a source storage system and a
2 backup storage system and, to maintain in the backup storage system information from
3 which a set of source files stored on the source storage system can be restored, is configured
4 for execution thereon of agents that together, for each of a sequence of storage times:

5 A) by monitoring writes to files in the source storage system since the previous
6 storage time, identify locations in the source storage system where changes
7 have been made since that previous storage time; and

8 B) in response to thus identifying locations, store in the backup storage system:

- 9 i) contents that at that storage time occupy locations thus identified; and
10 ii) associations of those contents with those locations.

1 68. (Previously Presented): A system as defined in claim 67 wherein the associations of
2 the contents with the locations associate the contents with the files in the source storage
3 system to which those contents were written.

1 69. (Previously Presented): A system as defined in claim 68 wherein at least one said agent
2 provides in the backup storage system associations between the contents there stored and the
3 storage times for which those contents were stored.